CLAIMS

What is claimed is:

1. An optical instrument comprising:

a transmitter that emits an optical signal;

a reflector assembly which directs said optical signal onto a specimen;

a detector assembly which detects a reflected optical signal from the specimen;

a first drive mechanism for varying the position of said optical signal on the specimen; and

a second drive mechanism for varying the position of the specimen relative to said optical signal.

2. The optical instrument of claim 1, wherein said reflector assembly directs said optical signal along a first path onto the specimen and directs said reflected optical signal along a second path to said detector, said first path and said second path having a common path segment.

3. The optical instrument of claim 2, further comprising a beam splitting mirror having an opening, said beam splitting mirror defining one end of said common path segment.

4. The optical instrument of claim 3, wherein said first path and said second path approach said beam splitting mirror from a first direction and a second direction respectively.

5. The optical instrument of claim 4, wherein said beam splitting mirror allows passage of said first path through said opening and reflects said second path.

6. The optical instrument of claim 1, wherein said second drive mechanism moves the specimen in a linear manner.

7. The optical instrument of claim 1, wherein said second drive mechanism moves the specimen in an arcuate manner.

8. The optical instrument of claim 1, wherein said first drive mechanism moves said optical signal substantially perpendicular to movement of the specimen.

9. The optical instrument of claim 1, wherein said first drive mechanism includes a scanning lens to focus said optical signal onto the specimen.

10. The optical instrument of claim 1, wherein said first drive mechanism includes a galvanometric torque motor.

11. An optical instrument comprising:

a transmitter that emits an optical signal;

a beam splitting mirror having an opening;

a reflector assembly which directs said optical signal along a first path passing through said opening and onto a specimen;

a detector assembly which detects a reflected optical signal from the specimen, said reflected optical signal defining a second path directed by said beam splitting mirror;

a first drive mechanism including a scanning lens for varying the position of said optical signal on the specimen; and

a second drive mechanism for varying the position of the specimen relative to said optical signal.

12. The optical instrument of claim 11, wherein said transmitter includes a plurality of lasers having optical signal of different wavelengths.

13. The optical instrument of claim 12, further comprising a dichroic beam combiner to combine said plurality of optical signals along said first path.

14. The optical instrument of claim 11, wherein said first drive mechanism includes:

a galvanometric torque motor having a sector shaped cam;

a carriage;

a retainer to fixedly hold a specimen to said carriage; and

a first and second wire attached between said cam and said carriage, whereby rotation of said cam is translated into linear movement of the specimen.

15. The optical instrument of claim 11, wherein said secondt drive mechanism includes:

a precision stepper motor having a screw;

a carriage having a nut engaging said screw;

a retainer to fixedly hold a specimen to said carriage; and

said stepper motor operable to rotate said screw, whereby rotation of said screw is translated into linear movement of the specimen.

16. A method of scanning fluorescent samples comprising the steps of:

(a) exciting the samples with an optical signal of a known first wavelength;

(b) detecting an optical signal of a second wavelength;

(c) translating said optical signal in a first and second direction; and

(d) translating the sample in a third direction substantially perpendicular to said first and said second direction.

17. A method as recited in claim 16, wherein step (a) further comprises combining a plurality of optical signals prior to exciting of the sample.

18. A method as recited in claim 16, wherein step (b) further comprises splitting said optical signal into a plurality of optical signals prior to detecting.

19. A method as recited in claim 16, wherein a portion of said exciting optical signal and a portion of said detecting optical signal have a common path.